Sampling Techniques: exam practice

10 questions · 27 marks · worked solutions and markschemes

Name _____ Date _____ Score / 27

- Answer every question before you look at the solutions. They start after the last question, with the marks for each line: M for method, A for accuracy, R for reasoning.
- Online, with more practice: ibmathrevision.com/slai/sampling-techniques-exam-practice

1. **1 mark · Paper 1 style · calculator allowed**

A systematic sample with sampling interval 20 is taken from a population of 860 items.

Find the number of items in the sample. **[1]**

2. **2 marks · Paper 1 style · calculator allowed**

A simple random sample of 15 people is chosen from a club with 300 members.

Find the probability that a particular member is chosen. **[2]**

3. **3 marks · Paper 1 style · calculator allowed**

A school has 450 students in Year 11, 350 in Year 12 and 200 in Year 13. A stratified sample of 60 students is taken by year group.

Find the number of students from each year group in the sample. **[3]**

4. **3 marks · Paper 1 style · calculator allowed**

A factory has three shifts with 84, 120 and 96 workers. A stratified sample of 25 workers is taken by shift.

Find the number of workers from each shift, giving whole numbers. **[3]**

5. **3 marks · Paper 1 style · calculator allowed**

A systematic sample of 40 people is taken from a list of 1200. The first person chosen is number 7.

(a) Find the sampling interval. **[1]**

(b) Find the number of the fourth person chosen. **[2]**

6. **3 marks · Paper 1 style · calculator allowed**

For a project, Lena records the number of siblings of each student in her class and the height of each student.

(a) State whether each type of data is discrete or continuous. **[2]**

(b) There are 28 students in the class and she measures 7 of them. Find the percentage of the class in her sample. **[1]**

7. **4 marks · Paper 1 style · calculator allowed**

State the sampling method used in each case.

(a) A researcher interviews the first 20 people who walk into a shop. **[1]**

(b) A computer picks 50 student numbers at random from the school list. **[1]**

(c) A factory tests every 25th item made. **[1]**

(d) A survey keeps interviewing until it has 30 men and 30 women. **[1]**

8. **2 marks · Paper 1 style · calculator allowed**

Eight lengths, in cm, are recorded: $24,\ 27,\ 25,\ 2.6,\ 23,\ 28,\ 26,\ 25$. One value was entered without its decimal point moved correctly: it should be 26.

(a) Find the mean of the data as recorded. **[1]**

(b) Find the correct mean. **[1]**

9. **3 marks · Paper 1 style · calculator allowed**

A town has an adult population that is 55% female and 45% male. A quota sample of 120 adults is planned.

(a) Find the number of women and of men in the sample. **[2]**

(b) Give one reason why a quota sample may be biased. **[1]**

10. **3 marks · Paper 1 style · calculator allowed**

To find how many hours a week adults in a city exercise, a researcher asks 100 people at a gym. The mean from the sample is 6.4 hours.

(a) Explain why the sample is likely to be biased. **[1]**

(b) Suggest a better sampling method. **[1]**

(c) The total number of hours for the 100 people was recorded. Find this total. **[1]**

Answers and worked solutions

Question 1 — 1 mark

Answer: 43

$\frac{860}{20} = 43$ **A1**

Question 2 — 2 marks

Answer: 0.05

$\frac{15}{300}$ **(M1)**

0.05 **A1**

Question 3 — 3 marks

Answer: 27, 21 and 12

$\frac{450}{1000} \times 60$ **(M1)**

Year 11: 27, Year 12: 21 **A1**

Year 13: 12 **A1**

Question 4 — 3 marks

Answer: 7, 10 and 8

$\frac{84}{300} \times 25 = 7$ **(M1)**

10 **A1**

8 **A1**

Question 5 — 3 marks

Answer: (a) 30; (b) 97

(a)

$\frac{1200}{40} = 30$ **A1**

(b)

$7 + 3 \times 30$ **(M1)**

97 **A1**

Question 6 — 3 marks

Answer: (a) siblings discrete, height continuous; (b) 25%

(a)

number of siblings: discrete **A1**

height: continuous **A1**

(b)

25% **A1**

Question 7 — 4 marks

Answer: (a) convenience; (b) simple random; (c) systematic; (d) quota

(a)

convenience sampling **A1**

(b)

simple random sampling **A1**

(c)

systematic sampling **A1**

(d)

quota sampling **A1**

Question 8 — 2 marks

Answer: (a) 22.575 cm; (b) 25.5 cm

(a)

22.575 cm **A1**

(b)

25.5 cm **A1**

Question 9 — 3 marks

Answer: (a) 66 women and 54 men

(a)

$0.55 \times 120 = 66$ **A1**

54 men **A1**

(b)

the interviewer chooses who to ask, so the sample is not random **R1**

Question 10 — 3 marks

Answer: (c) 640 hours

(a)

people at a gym probably exercise more than other adults **R1**

(b)

a simple random sample from a list of all adults in the city **A1**

(c)

640 hours **A1**

Every solution is also on ibmathrevision.com/slai/sampling-techniques-exam-practice
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